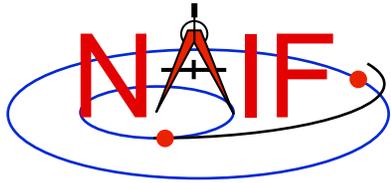


Navigation and Ancillary Information Facility

SPICE Introduction

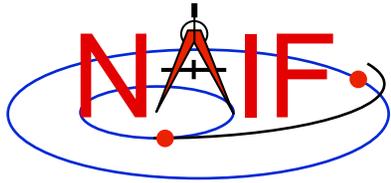
January 2012



History

Navigation and Ancillary Information Facility

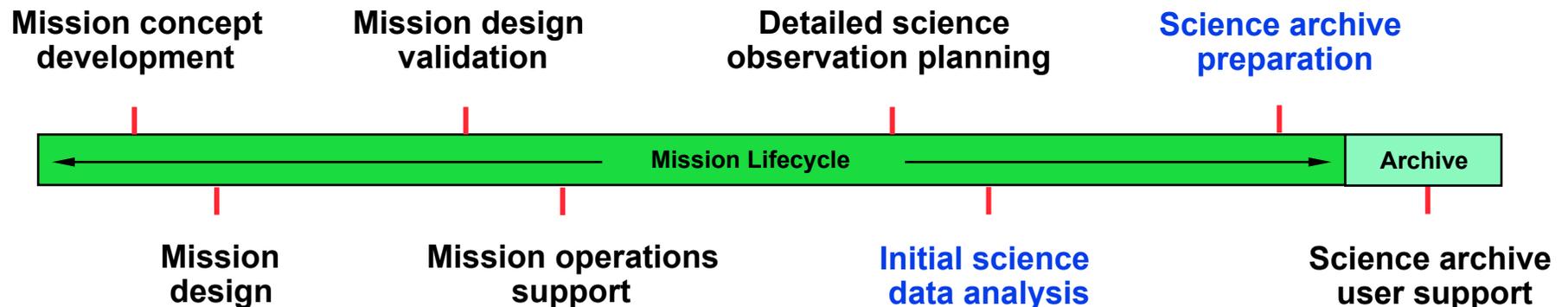
- **Implementation of a precursor to SPICE was initiated in 1984 as part of a major initiative to improve archiving and distribution of space science data in all NASA disciplines**
- **Responsibility for leading SPICE development was assigned to the newly-created Navigation and Ancillary Information Facility (NAIF), located at the Jet Propulsion Laboratory**
- **Today's SPICE system dates from about 1991**

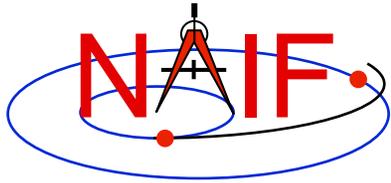


Breadth of Use

Navigation and Ancillary Information Facility

- The original focus of SPICE was on ancillary data and associated software needed by scientists for:
 - initial science data analysis
 - science archive preparation
- The scope of SPICE usage has grown to cover the full mission lifecycle, as well as post-mission archive uses.



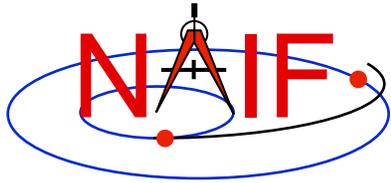


Major SPICE Users*

Navigation and Ancillary Information Facility

- **SPICE is used on all NASA planetary exploration projects**
 - Examples: All Mars missions, Cassini, Deep Impact, Messenger, Juno
- **Limited SPICE data have been (or are being) created for some past missions**
 - Examples: Voyager, Viking Orbiter
- **SPICE is used to some degree in support of some space physics and astrophysics missions**
 - Examples: Hubble Telescope, Spitzer Telescope, IBEX, Wide, Kepler
- **SPICE was or is used on many non-NASA missions**
 - **Russia's** Mars 96 and Phobos-Grunt; **ESA's** Huygens Probe, Smart-1, Mars Express, Rosetta and Venus Express; **Japan's** Hayabusa and SELENE; **India's** Chandrayaan-1
- **SPICE will be used on at least one NASA earth science mission (SMAP)**
- **SPICE ephemerides are used at some terrestrial observatories**
- **SPICE is used by NASA's Deep Space Network for both scheduling and operating the DSN antennas.**

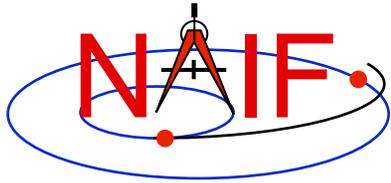
* Not all are supported by NAIF; some are using SPICE on their own.



Ancillary Data Archives

Navigation and Ancillary Information Facility

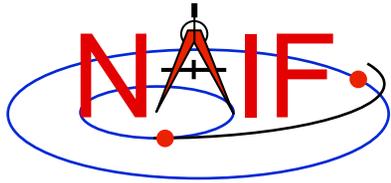
- **SPICE is the U.S. Planetary Data System's de facto standard for archiving ancillary data**
 - (But it's not a formal requirement)
- **SPICE data for European planetary missions are archived in ESA's Planetary Science Archive**
 - Some of these data will be mirrored on the NAIF server
- **SPICE data for some Japanese, Indian and Russian missions may be available in the future from their local archives**
 - Already the case for Hayabusa
- **SPICE, or some SPICE principles, might play a role in the future International Planetary Data Alliance (IPDA)**



Distribution and Use of SPICE

Navigation and Ancillary Information Facility

- **SPICE system components are freely distributed**
 - Projects pay for local deployment and operation, done either by their own personnel, or by NAIF, or a combination
 - There are no U.S. ITAR restrictions on distribution
 - There are no licensing requirements
- **Users get complete source code and much documentation**
- **SPICE user's are encouraged to reference SPICE when it has provided a significant contribution to one's work**
- **See the "Rules" link on the NAIF Home Page for a complete list of rules and recommendations**



Training Materials

Navigation and Ancillary Information Facility

- **This set of tutorials has been presented and revised numerous times**
 - **No matter how hard we try, it seems impossible to:**
 - » **get all the facts absolutely right and up-to-date**
 - » **get the level of detail “right” for every student**
 - » **get all of the language clear, complete and concise**
 - » **present everything in the “correct” order**
- **These training materials are meant to supplement—not replace—the subroutine headers and the “required reading” reference documents that are the primary sources for user information about SPICE**